

Appendix D Case Histories

D-1. Markland Incident of 1967

This incident resulted from a barge tow breaking loose from an upstream mooring (tied to a tree on the bank that pulled out) and floating into the dam. The barges sank in the dam gate bays with some of the barges wrapping around the piers; thus the tainter gates were prevented from closing during a return from open river conditions. The resulting loss of pool caused major damage to harbors, stranded boats, sloughing highway embankments, water intakes, and sewer outfalls. Figure D-1 shows the removal of the barge from the Markland Lock and Dam. Based on this incident, the Corps developed recommendations for design guidance.

D-2. Summary of Recommendations

The following edited version of the recommendations contains guidance that relates to the lock and dam design and operation.

a. Prevention of accidents - lock and dam.

(1) Recommend installing remote control systems to provide for operation of spillway gates from the operations building.

(2) Recommend that Corps of Engineers Regulations prohibit operators from mooring unattended tows within 10 river miles upstream of a dam, except at commercial docks, bonafide mooring facilities, government furnished mooring facilities, or fleeting areas.

(3) Recommend installation, for tows awaiting lock-ages, mooring facilities both upstream and downstream of navigation structures.

(4) Recommend each district institute training programs for lock and dam personnel to familiarize them with types of decisions made in emergency situations.

b. General recommendations.

(1) Recommend the Corps of Engineers establish formal liaison and participate with the Coast Guard, other federal agencies, and Navigation Industry Groups in public deliberations and studies concerning the enforcement of safe navigation on the canalized rivers.

(2) Subjects that may be discussed by these and other bodies which could significantly influence the Corps' plans for protection of its navigation structures and on which the Corps' views should be made known include the following:

(a) The analysis of requirements for permanent mooring facilities between dams.

(b) The development of more specific regulations affecting mooring procedures.

(c) Regulation of the size and power of tows to assure safe control of the movement of the tows under any reasonably anticipated river conditions.

(d) Coast Guard examination and licensing of selected personnel on towboats and self-propelled barges.

(e) Mechanical inspection of towboats by the Coast Guard.

c. Engineering modifications. Recommend engineering and economic feasibility studies for installation of protective barriers, lengthened guide walls upstream of dams, or modification of piers to prevent major damage to structures by runaway tows.

d. Recovery operations - equipment.

(1) Recommend procurement of a whirler-type derrick-boat of approximately 300-ton capacity to be based at the Service Base.

(2) Recommend for each district the provision (either by modification or procurement) of a towboat of sufficient thrust and size to facilitate handling of floating plant that would be used in a recovery operation.

(3) Recommend each district fabricate or procure effective power-driven cutting beams to separate barges wrapped around the dam pier structures.

(4) Recommend technical assistance from the Office, Chief of Engineers, and other engineer agencies, such as Engineer Research and Development Laboratories, to determine feasibility of utilizing explosive anchors for emergency mooring of recovery rigging to the lock and dam structures.

(5) Recommend each district examine its capabilities to ensure the following:

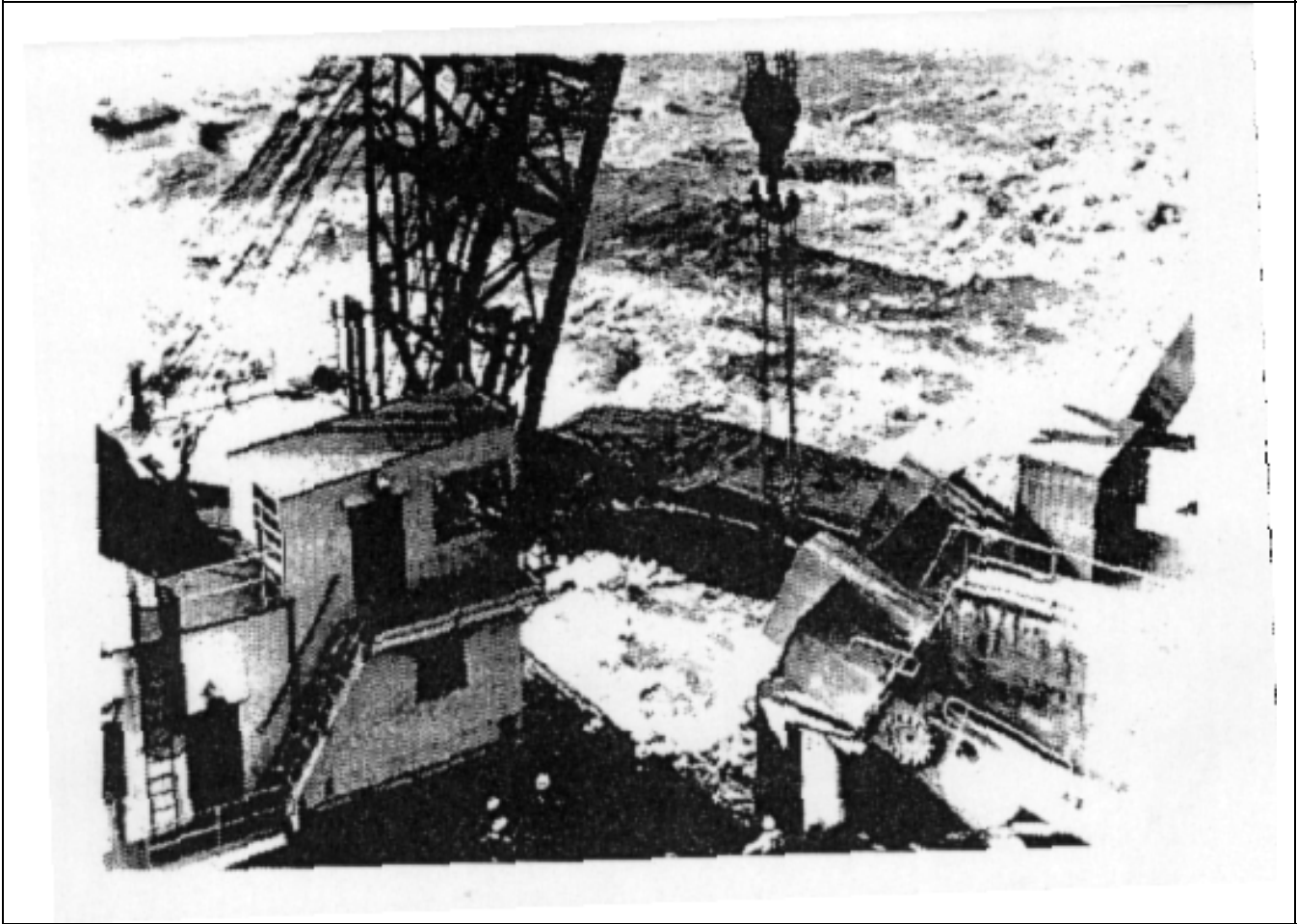


Figure D-1. Removal of barge wrapped around dam pier - Markland Lock and Dam, Ohio River, 1967

(a) Capability for rigging of heavy wire ropes and chains and for underwater cutting of steel by torch.

(b) Development of sounding techniques to accurately determine the underwater positions of sunken barges and obstructions.

(c) Provision of heavy anchors, and provision of suitable anchor derrick and winch barge for use in safely positioning floating plant above dam.

(d) Supply of assorted heavy slings and haul cables with suitable terminal fittings and quick-release devices.

(e) Development of grappling devices and techniques for quick attachment of haul cables to submerged barges not accessible for conventional attachment.

(f) Development of equipment and techniques for quick introduction of compressed air into sunken barge compartments.

(g) Provision of adequate radio communications during recovery operations between government, navigation, and contractor interests.

e. Modification of lock and dam structures.

(1) Recommend provision of adequate facilities on river walls, piers, and abutments both upstream and downstream of navigation structures for positioning floating plant and for rigging during recovery operations.

(2) Recommend design and procurement of special lifting beams for use with overhead bulkhead cranes.

(3) Recommend engineering and economic and feasibility studies to provide for more versatile use of the overhead piggy-back cranes to increase the capacity to 50 tons and to include clamshell bucket operation and lowering of personnel to work areas.

(4) Recommend engineering and economic feasibility studies for preinstallation of chain slings in gate bays to expedite removal of objects with bulkhead crane.

(5) Recommend each district install anchor bolts on river wall immediately upstream of the dams to facilitate timely installation of portable winches.

f. Organization.

(1) Recommend each district organize a marine disaster recovery team to ensure adequate supervision of three-shift recovery operations over an extended period.

(2) Recommend each district have a trained, experienced Technical Liaison Office as a single point of contact for coordination of public information activities during emergencies.

(3) Recommend each district maintain a current list of marine contractors and contractors' equipment available for possible use in marine disaster recovery operations.

(4) Recommend that periodic seminars be conducted with key personnel, such as Chiefs of Branches and Construction Resident Engineers, reviewing plans and capabilities and preestablishing key emergency team members for recovery operations.